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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/584,712

06/26/2006

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900-555

5078

23117 7590 12/10/2008
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EXAMINER

PATEL, DEVANG R

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

12/10/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/584,712	KAWAGOE ET AL.	
	Examiner	Art Unit	
	DEVANG PATEL	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/6/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-4** are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-022188 A (referring as JP'188, of record) in view of Kannegiesser et al. (US 6309506, referring as US '506), and further in view of Garbini et al. (US 3883386, of record).

a. **Regarding claim 1, JP'188** discloses a production method for a solar battery module comprising the steps of:

i. utilizing a production apparatus [fig. 1] including a conveyance mechanism (equivalent to positioning belt) for placing cell c having an interconnect, onto the supply stage 11 [¶ 29], a heating conveyor belt 10, and a press belt 55 [having pressure bar 56] extending over the positioning conveyor and the heating belt in an opposed relation to the positioning conveyor and the heating belt.

ii. JP'188 does not disclose the press belt overlapping at least a portion of the positioning belt. However, **US '506** (drawn to conveyor apparatus for joining surface structures) discloses upper conveyor belt 31

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(analogous to pressing belt) overlapping at least a portion of the lower conveyor belt 30 (analogous to positioning belt) [fig. 2, col. 4, lines 46-50].

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide overlapping arrangement similar to US '506 in the apparatus of JP '188 because doing so would have yielded a smooth transition of the substrate being conveyed (photovoltaic cell from the supply stage to the connection stage).

iii. It is not clear whether the apparatus of JP'188 is adapted to control the heating belt and the press belt at predetermined temperatures. Garbini et al. (hereafter **Garbini**) is drawn to a continuous conveyor apparatus for joining flat materials by heating under pressure. Garbini also discloses a positioning belt 4 for feeding the articles 5. Garbini discloses an upper heating conveyor belt 1 and a lower conveyor belt 3 [fig. 1]; raising the temperature of the metal belt to the desired value [col. 1, line 50 thru col. 2, line 8]. Garbini discloses a further embodiment wherein both continuous belts include heating means 2 [fig. 2; col. 2, lines 15-19]. Thus, it is possible to control the heating belt and the press belt at predetermined temperatures [fig. 2]. Moreover, the belts are lined with an anti-adhesive material in order to avoid any adhesion between the treated parts and belts themselves [col. 2, lines 9-15]. It would have been obvious to a person of ordinary skill in the art to modify the conveyor apparatus of JP'188 by the conveyor belts of Garbini because doing so achieves a very

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fast and uniform heating of the whole belt and avoids adhesion between the workpiece and the belts [col. 1, line 66; col. 2, line 11]. Additionally, an artisan would have been motivated to provide a pair of opposing heating and press belts as shown by Garbini in order to obtain more efficient and uniform joining of the workpieces (solar battery cells in this case) [col. 1, lines 39-49].

iv. JP '188 discloses positioning a plurality of solar battery cells [c] and interconnectors [t] required for connection of the battery cells on an upstream portion of the positioning belt and transporting the solar battery cells and the interconnectors to a downstream portion of the positioning belt [¶ 15];

v. JP '188 discloses transferring the solar battery cells and the interconnectors transported to the downstream portion of the positioning belt onto the heating belt while holding the solar battery cells and the interconnectors between the positioning belt and the press belt;

vi. JP '188 discloses holding the solar battery cells and the interconnectors transferred onto the heating belt between the heating belt and the press belt and soldering the interconnectors to the solar battery cells while transporting the solar battery cells and the interconnectors [claim 3].

b. **As to claim 2**, Garbini discloses lining the belt with fiberglass or Teflon, which is composed of resin.

- c. **As to claim 3**, JP '188 discloses:
 - vii. a positioning belt (conveyance mechanism not shown) and a heating belt (10) located adjacent each other in a transferable manner [fig. 1]; and
 - viii. a press belt 55 extending over the positioning belt and the heating belt in opposed relation to the positioning belt and the heating belt. JP '188 in view of US '506 and Garbini discloses that the heating belt and press belt are each controlled at a predetermined temperature, and wherein the press belt overlaps at least a portion of the positioning belt (as explained in claim 1 above).
- d. **As to claim 4**, Garbini discloses lining the belt with fiberglass or Teflon [col. 2, line 59], which is composed of resin.
- 3. **Claims 5-8** are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'188 in view of Garbini, and further in view of Focke et al. US 5674542, of record.
 - e. **Regarding claims 5 & 7**, JP'188 discloses a production method for a solar battery module comprising an apparatus including a heating belt and a press belt disposed in opposed relation as explained in claim 1 above. JP '188 in view of Garbini discloses controlling the heating belt and pressing belt at predetermined temperatures as explained in claim 1 above. None of the references discloses at least one upper and lower resilient member to bias the belt toward each other. However, **Focke** et al. discloses flexible leaf springs 35 which exert pressure on the upper conveyor belt 24 so that the upper conveyor

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24 and the lower conveyor 23 are pressed together [fig. 1; claim 3]. The claim would have been obvious because employing leaf springs of Focke in the upper and lower conveyor belts of JP' 188 would have yielded the predictable result of effectively pressing the conveyor belts together to one of ordinary skill in the art at the time of the invention. An artisan would have been motivated to incorporate such springs for pressing the belts in order to provide effective heating while conveying the solar cells. The apparatus is adapted to control the heating belt and the press belt at predetermined temperatures as explained in claim 1 above.

ix. JP '188 discloses holding a plurality of solar batter cells and interconnectors between the heating belt and the press belt in a properly positioned state; and

x. soldering the interconnectors to the cells [JP '188- claims 1-3].

f. **As to claims 6 and 8**, apparatus of JP'188 in view of Focke discloses at least one upper and lower springs as explained in claim 5 above.

g. **As to claims 9-10**, providing a number of resilient members as claimed is merely a provision of adjustability, which involves only routine skill in the art.

4. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over JP'188 ,US '506, and Garbini as applied to claim 3 above, and further in view of Meyer (US 4997507).

h. **As to claim 11**, JP '188 discloses upper heating blocks (80-82), but fails to disclose lower heating blocks or cooling blocks as claimed. However, Meyer (drawn to apparatus for bonding laminar workpieces, fig. 1) discloses upper

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heating blocks (42, 48), lower heating blocks (40, 46), and cooling blocks 70 (both upper & lower- col. 6, lines 36-46). Meyer also discloses that apparatus is not limited to the configuration of the two conveyor belt assemblies (14, 16), but, if desired, it may include only one conveyor belt assembly. In such a case, the lower conveyor belt (i.e. heating belt 18) would extend from the feed station through the delivery station, including the cooling zone. Similarly, the upper belt (press belt 20) would extend through the exit of the cooling zone [col. 8, lines 58-68]. Such an arrangement would include upper and lower cooling blocks 70 as claimed. It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide heating and cooling zones similar to Meyer in the apparatus of JP'188 in order to regulate the temperature and uniformly and/or more rapidly heat or cool the workpieces (solar module in this case) passing therethrough (col. 6, lines 40-46).

5. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over JP'188, Garbini, and Focke as applied to claim 7 above, and further in view of Meyer (US 499507).

i. **As to claim 12**, JP '188 discloses upper heating blocks (80-82), but fails to disclose lower heating blocks or cooling blocks as claimed. However, Meyer discloses upper heating blocks (42, 48), lower heating blocks (40, 46), and cooling blocks 70 (both upper & lower- col. 6, lines 36-46). Meyer also discloses that apparatus is not limited to the configuration of the two conveyor belt assemblies (14, 16), but, if desired, it may include only one conveyor belt

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assembly. In such a case, the lower conveyor belt (i.e. heating belt 18) would extend from the feed station through the delivery station, including the cooling zone. Similarly, the upper belt (press belt 20) would extend through the exit of the cooling zone [col. 8, lines 58-68]. Such an arrangement would include upper and lower cooling blocks 70 as claimed. It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide heating and cooling zones similar to Meyer in the apparatus of JP'188 in order to regulate the temperature and uniformly and/or more rapidly heat or cool the workpieces (solar module in this case) passing therethrough (col. 6, lines 40-46).

6. **Claims 13-17** are rejected under 35 U.S.C. 103(a) as being obvious over Meyer (US 499507).

j. **Regarding claim 13**, Meyer discloses a conveyor apparatus that is capable of producing a solar battery module, the apparatus comprising:

xi. a heating belt 18/20 and a press belt 18/20 disposed in opposed relation, capable to transfer solar cells of a solar battery module therebetween [fig. 1];

xii. an upper heating block 42 disposed on a back of a side of the heating belt would be facing the solar cells and arranged to heat the solar cells;

xiii. a lower heating block 40 disposed on a back of a side of the press belt would be facing the solar cells and arranged to heat the solar cells;

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xiv. Meyer does not expressly show an upper cooling block disposed on the back of the side of the heating belt or a lower cooling block disposed on the back of the side of the press belt. However, Meyer discloses that apparatus is not limited to the configuration of the two conveyor belt assemblies (14, 16), but, if desired, it may include only one conveyor belt assembly. In such a case, the lower conveyor belt (i.e. heating belt 18) would extend from the feed station through the delivery station, including the cooling zone. Similarly, the upper belt (press belt 20) would extend through the exit of the cooling zone [col. 8, lines 58-68]. Such an arrangement would include upper and lower cooling blocks 70 [col. 6, lines 36-46] as claimed. It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide such arrangement in the apparatus of Meyer because it is an art-recognized alternative.

k. **As to claim 14**, the upper and lower cooling blocks of Meyer are on a down stream side of the upper and lower heating blocks as measured relative to a direction of transfer of the workpieces (solar cells).

l. **As to claims 15-16**, the heating blocks of Meyer are controllable to set desired temperature to sufficiently heat the workpieces in order to form a sufficient bond [col. 5, lines 54- 58]. Similarly, the cooling blocks are also controlled to regulate the temperature of the cooling zone [col. 6, lines 36-42]. Thus, the heating and cooling blocks are capable of providing sufficient energy to melt and cool the solder on the solar cells, respectively.

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m. **As to claim 17**, the upper and lower heating blocks are arranged to heat entire surfaces of the workpieces (solar cells).

7. **Claims 18-19** are rejected under 35 U.S.C. 103(a) as being obvious over Meyer (US 499507) as applied claim 13 above, and in view of Matsuda et al. (US 5379228).

n. **As to claim 18**, Meyer does not disclose a shroud surrounding the upper and lower heating or cooling blocks. Matsuda et al. ("Matsuda") is directed to a heat treatment during manufacturing of sintering type solar cell plate [col. 1, lines 6-12]. Matsuda discloses a heat treatment container 9 with a plate 10 carried on a conveyor belt 8 through the muffler 11 (i.e. heating block) in an inert gas atmosphere 12 [col. 1, lines 25-30]. Matsuda discloses a cover 16 (i.e. shroud) with apertures portions for controlling the heat radiation from the heater of the furnace and evaporation of the film components [col. 1, lines 40-43]. It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate an apertured cover similar to Matsuda on the heating and cooling blocks of Meyer in order to control the heat radiation, and the degree of cooling.

o. **As to claim 19**, Matsuda discloses an inside of the shroud 16 being kept in an inert atmosphere 12. It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide nitrogen atmosphere since nitrogen is a well-known inert gas.

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8. **Claims 20-21 and 23-24** are rejected under 35 U.S.C. 103(a) as being obvious over Meyer (US 499507) as applied claim 13 above, and in view of Kannegiesser et al. (US 6309506, US '506).

p. **As to claim 20**, Meyer fails to disclose a positioning belt adjacent to the heating belt along a transfer direction, wherein the pressing belt overlaps at least a portion of the positioning belt. However, Meyer discloses that the apparatus is not limited to configuration of two conveyor belt assemblies 14 and 16, but may include more than two conveyor belt assemblies [col. 8, lines 58-62]. Such encompasses a separate conveyor belt for the feeding station (i.e. positioning belt). **US '506** (drawn to conveyor apparatus for joining surface structures) discloses a lower conveyor belt 30 (analogous to a positioning belt; fig. 2) positioned adjacent to a center conveyor belt 30 (analogous to heating belt). US '506 discloses an upper conveyor belt 31 (analogous to pressing belt) overlapping at least a portion of the lower conveyor belt 30 (positioning belt) [fig. 2, col. 4, lines 46-50]. It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide configuration similar to US '506 in the apparatus of Meyer in order to effectively convey the workpieces from the feeding station to the heating & pressing zone. One would have been motivated to provide the overlapping portion because doing so would have yielded a smooth transition of the workpieces being conveyed.

q. **As to claim 21**, Meyer discloses a diameter of a pulley 28 [fig. 2] of the feeding station (positioning belt as explained in claim 20 above) being less than a

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diameter of a pulley 30 of the adjacent heating belt. The claim would have been obvious at the time of the invention because selecting a diameter of the pulley is a mere provision of adjustability, involving only routine skill in the art.

r. **As to claim 23**, Meyer discloses that the apparatus is not limited to configuration of two conveyor belt assemblies 14 and 16, but may include more than two conveyor belt assemblies [col. 8, lines 58-62]. In view of that, the claim would have been obvious because the conveyor belts were known in the prior art and one skilled in the art could have combined more than one (i.e. a plurality) of each type of belts (upper and lower) with no changes in their respective functions, and the combination would have yielded the predictable results to an artisan at the time of the invention.

s. **As to claim 24**, Meyer discloses the number of each type of belts being equal (upper and lower as explained in claim 23 above). The limitation of determining the number of belts based on a number of connection leads for each cell relates to a material or article being worked upon by a structure being claimed, and is of no significance in determining patentability of the apparatus claim.

9. **Claim 22** is rejected under 35 U.S.C. 103(a) as being obvious over Meyer (US 499507) in view of US '506 as applied to claim 20 above, and further in view of Rasero (US 2983304).

t. **As to claim 22**, neither Meyer nor US '506 discloses the belt formed of a polyurethane resin impregnated with nylon filaments. However, Rasero (drawn to

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a conveyor belt) discloses a belt composed of a polyurethane resin impregnated with nylon filaments [col. 1, lines 42-48; col. 2, lines 18-24], such belt having characteristics of an improved resilience, tensile strength and tear resistance [col. 1, lines 50-53]. It would have been obvious to a person of ordinary skill in the art at the time of the invention to form the positioning belt of Meyer from a polyurethane resin impregnated with nylon filaments in order to impart improved resilience, tensile strength and tear resistance to the conveyor belt [col. 1, lines 50-53].

Response to Amendment and Arguments

Applicant's arguments with respect to amended claims 1-8 have been considered but are moot in view of the new ground(s) of rejection set forth above.

Applicant argues that endless belt 66 and conveyor 10 of JP'188 are not in opposed relationship to each other, but they are offset. Examiner respectfully disagrees. In accordance with broadest reasonable interpretation, being offset meets being in opposed relationship. Regardless, JP '188 as modified by Garbini clearly discloses conveyor belts in opposed relationship to each other.

Applicant states that the office action alleges that supply stage is equivalent to the positioning belt. Examiner clarifies that the supply stage was not taken as being a positioning belt, but a conveyance mechanism (not illustrated as stated by JP '188), associated with the supply stage [JP '188 translation- ¶ 29], was taken to be a positioning belt.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 11/6/08 was filed after the mailing date of the first Office Action on 6/23/08. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Claims 1-24 are rejected.

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the art would have reasonably

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understood from the texts. Only specific portions of the texts have been pointed out to emphasize certain aspects of the prior art, however, each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

Applicant is reminded to specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. 1.121; 37 C.F.R. Part 41.37; and MPEP 714.02.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVANG PATEL whose telephone number is (571)270-3636. The examiner can normally be reached on Monday thru Thursday, 8:00 am to 5:30 pm, EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. P./

Examiner, Art Unit 1793

/Kiley Stoner/

Primary Examiner, Art Unit 1793